APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/942,896	08/30/2001	Hironaga Nakatsuka	450100-03436	9838

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FROMMER LAWRENCE & HAUG
745 FIFTH AVENUE- 10TH FL.
NEW YORK, NY 10151

EXAMINER
ALBERTALLI, BRIAN LOUIS

ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 07/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/942,896	NAKATSUKA, HIRONAGA
	Examiner	Art Unit
	Brian L Albertalli	2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-12</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-12</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>30 August 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☒ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1.   Claims 1, 5-6, and 10-12 are objected to because of the following

informalities: the terms "most likelihood method" and "complex statistic method"

are more commonly known in the art as --maximum likelihood method--and --

mixed statistic method--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2.   The following is a quotation of the appropriate paragraphs of 35

U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3.   Claims 1, 4, 5, 8, and 10-12 are rejected under 35 U.S.C. 102(b) as being

anticipated by Matsui et al. (U.S. Patent 5,835,890).

4.   In regard to claim 1, Matsui et al. discloses an apparatus that includes a

data extraction means (feature extracting part 11, Fig. 3) (column 5, lines 34-40),

as well as a model adaptation means (adaptation part 15). The model adaptation

means adapts the extracted data by means of the most (maximum) likelihood

method (column 6, lines 10-59).

5.   In regard to claim 4, Matsui et al. discloses that the pattern recognition is

performed on the basis of feature distribution in a feature space (recognition

result step S5, column 7, lines 22-35). The model adaptation means (adaptation part 15) adapts the model using the feature distribution obtained from the extracted data (column 6, lines 10-21).

6.   In regard to claim 5, Matsui et al. discloses that a measure indicating the degree to which the extracted data is observed in the predetermined model becomes maximum, by means of the most (maximum) likelihood method (Equation 4, column 6, lines 10-59).

7.   In regard to claim 8, Matsui et al. discloses that the input data is voice (speech) data (column 5, 34-40).

8.   In regard to claim 10, Matsui et al. discloses a method of adapting a model used in pattern recognition which includes the steps of:

Extracting input data corresponding to a predetermined model, observed during a predetermined interval, and then outputting the extracted data (Fig. 2, step S1, column 5, lines 34-40).

And adapting the predetermined model extracted during the predetermined interval by means of the most (maximum) likelihood method (Fig. 2, step S3, column 6, lines 10-59).

9.   In regard to claim 11, Mastui et al. discloses a storage medium (Fig. 3, memory 10M) which stores a program for executing using a computer (control

part 10) adaptation of a model used in pattern recognition (column 5, lines 20-33). The program comprises the steps of:

Extracting input data corresponding to a predetermined model, observed during a predetermined interval, and then outputting the extracted data (step S1, column 5, lines 34-40).

And adapting the predetermined model extracted during the predetermined interval by means of the most (maximum) likelihood method (step S3, column 6, lines 10-59).

10.   In regard to claim 12, Matsui et al. discloses an apparatus for classifying input data in the form of a time series into one of a predetermined number of models. The apparatus includes:

A feature extraction means for extracting a feature value of input data and a data extraction means for extracting input data corresponding to a predetermined model observed during a predetermined interval that outputs the extracted data (feature parameter extracting part, Fig. 3, 11, extracts a feature value of the input data and extracts input data corresponding to a predetermined model observed during a predetermined interval, column 5, lines 34-48).

A storage means for storing a predetermined number of models (12).

A classifying means for classifying the feature value of the input data into one of said predetermined number of models (model sequence selecting part 13

selects model that are most closely matched to the input feature parameter

sequence, column 5, lines 41-67 and column 6, lines 1-9).

And a model adaptation means for adapting the predetermined model

using data extracted during the predetermined interval by means of the most

(maximum) likelihood method (adaptation part 15, column 6, lines 10-59).

Claim Rejections - 35 USC § 103

11.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described
> as set forth in section 102 of this title, if the differences between the subject matter sought to
> be patented and the prior art are such that the subject matter as a whole would have been
> obvious at the time the invention was made to a person having ordinary skill in the art to which
> said subject matter pertains. Patentability shall not be negatived by the manner in which the
> invention was made.

12.   Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Matsui et al. in view of Rao et al. (U.S. Patent 5,978,760).

Matsui et al. does not disclose that the model adaptation means by using

a freshness degree indicating the freshness of the extracted data. Matsui et al.

also does not disclose that the freshness degree is a function which varies

depending on the temporal position of the extracted data.

Rao et al. discloses a noise parameter generator (Fig. 4, 40) that creates

a noise model (noise parameters) that includes a freshness degree (exponential

weighting function) that indicates the freshness of the extracted data (column 4,

lines 4-43). The freshness degree (exponential weight) varies depending on the

temporal position of the extracted data (column 3, lines 43-51).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Matsui et al. so the model adaptation means also included a freshness degree to indicate the freshness of the extracted data, wherein the freshness degree was a function that varied depending on the temporal position of the extracted data, as disclosed by Rao et al., so that the model adaptation means would create a noise model that that represented the actual background noise better than a noise model without a weighting, as taught by Rao et al. (column 3, lines 9-11).

13.   Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui.

Matsui et al. discloses a model adaptation means that adapts a model so that a measure indicating the degree to which the extracted data is observed in a predetermined model becomes maximum by means of the maximum (most) likelihood method. Additionally, Mastui et al. discloses that the equation that calculates a measure indicating the degree to which the observed data is observed in a predetermined model requires the model parameters of the predetermined models (Equation 4, θ; see column 1, lines 51-67 and column 2, lines 1-7 for a definition of θ).

Matsui et al. does not disclose the model adaptation means determines a parameter of the predetermined model, which give a maximum value based on the maximum (most) likelihood method, by means of the Newton descent method or the Monte Carlo method.

The examiner takes official notice that it is well known in the art to use the Monte Carlo method to estimate statistical parameters in a Gaussian distribution.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Matsui et al. so the statistical parameters of a predetermined model were estimated by means of the Monte Carlo method, so the calculations could be done more quickly than calculating the exact statistical parameters of a predetermined model.

14.   Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui et al. in view of Komori et al. (U.S. Patent 6,108,628).

Matsui et al. discloses that the model adaptation means adapts a model so that a measure indicating the degree to which the extracted data is observed in a predetermined model becomes maximum by means of the most (maximum) likelihood method.

Matsui et al. does not disclose that the model adaptation means adapts a model so that a measure indicating the degree to which the extracted data is observed in a predetermined model becomes maximum or minimum by means of the minimum distance-maximum separation theorem, or that the measure is defined using a Bhattacharyya distance.

Komori et al. discloses that a measure indicating the degree to which extracted data is observed in a predetermined model becomes minimum by means of the minimum distance theorem (column 4, lines 24-55). The measure is defined using a Bhattacharyya distance (Equation 2).

It would have been obvious to one of ordinary skill in the art at the time of invention to alternatively modify Matsui et al. so models were represented in a feature space and so the degree to which extracted data was observed in a predetermined model was determined by the minimum distance theorem with the distance measure defined as a Bhattacharyya distance, as taught by Komori et al., in order to measure the similarity between two models in a more detailed manner by replacing the phoneme model HMM of Matsui et al. with a more detailed HMM dependent on the phoneme environment, as taught by Komori et al. (column 3, lines 56-67 and column 4, lines 1-7).

15.   Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui et al., in view of McKinley et al. (*Noise Model Adaptation in Model Based Speech Enhancement*).

Matsui does not disclose that the predetermined model is an acoustic model representing input data during an interval which is not a voice interval. An interval which is not a voice interval has been interpreted herein as a "no speech" interval.

McKinley et al. discloses a method of creating an acoustic model representing input data during an interval which is not a voice interval (noise model) and a method to adapt that noise model (sections 2 and 3).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Matsui et al. to create an acoustic model representing input data during an interval which was not a voice interval, as disclosed by McKinley

et al., because "noise model adaptation is essential for proper operation", as taught by McKinley et al. (abstract and section 1).

Conclusion

16.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

17.   Pao (U.S. Patent Application Publication US 2001/0025276) is an intervening reference that anticipates several features of the claimed invention. Therefore, it is suggested that a certified translation of Japanese application 2000-264035 filed on August 31, 2000 be submitted in accordance with 35 U.S.C 119(b) to perfect the claim for foreign priority. See MPEP § 201.15.

18.   Additionally, Takahashi et al. (U.S. Patent 5,793,891) discloses model adaptation apparatus that adapts a model by means of the maximum likelihood method. Potamianos et al. (U.S. Patent 5,930,753) discloses a model adaptation apparatus that adapts a model by means of the maximum likelihood method Downey (U.S. Patent 6,078,884) discloses a pattern recognition device that generates a noise model used to adapt reference patterns. Nguyen et al. (U.S. Patent 6,205,426) discloses a system that extracts N-best solutions from an input, and then uses an additional weighting technique to adapt the models.

19.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L Albertalli whose telephone number is
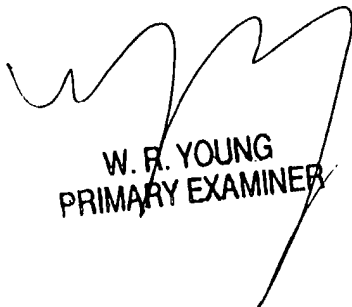
(703) 305-1817. The examiner can normally be reached on Monday - Friday,
8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the
examiner's supervisor, Talivaldis Smits can be reached on (703) 305-3011. The
fax phone number for the organization where this application or proceeding is
assigned is 703-872-9306.

20.   Information regarding the status of an application may be obtained from
the Patent Application Information Retrieval (PAIR) system. Status information
for published applications may be obtained from either Private PAIR or Public
PAIR. Status information for unpublished applications is available through
Private PAIR only. For more information about the PAIR system, see http://pair-
direct.uspto.gov. Should you have questions on access to the Private PAIR
system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-
free).

BLA 7/02/04

W. R. YOUNG
PRIMARY EXAMINER